

REMARKS

This is a full and timely response to the outstanding non-final Office Action mailed March 16, 2005. Upon entry of the amendments in this response, claims 11 – 38 remain pending. More specifically, Applicants amend claims 11, 19, 22, 25, 28, and 35 – 38. Reconsideration and allowance of the application and presently pending claims are respectfully requested.

I. Examiner Interview

Applicants first wish to thank the Examiner for indicating that the amended claims appear to overcome the cited references during a telephone discussion on June 8, 2005 regarding the outstanding Office Action. Thus, Applicant respectfully requests that the Examiner carefully consider this response and the amendments.

II. Rejections Under 35 U.S.C. §112

The Office Action indicates that claim 25 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Applicants amend claim 25 by removing the word “substrate.” Applicants submit that this amendment complies with the Office Action’s request and that no new matter has been added.

III. Rejections Under 35 U.S.C. §103

In order for a claim to be properly rejected under 35 U.S.C. §103, the teachings of the cited

art reference must suggest all features of the claimed invention to one of ordinary skill in the art. See, e.g., *In re Dow Chemical*, 837 F.2d 469, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988); *In re Keller*, 642 F.2d 413, 208 U.S.P.Q. 871, 881 (C.C.P.A. 1981). Further, “[t]he PTO has the burden under section 103 to establish a prima facie case of obviousness. It can satisfy this burden only by showing some objective teaching in the cited art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references.” *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988).

A. Claims 11 – 18, 25 – 34, 37 and 38 are Patentable Over *Ding*

1. Claim 11 is Patentable Over *Ding*

The Office Action indicates that claim 11 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 6,351,576 to Ding (“*Ding*”). Applicants respectfully traverse this rejection for at least the reason that *Ding* fails to disclose, teach, or suggest all of the elements of claim 11. Claim 11, as amended recites:

A structure for unfocused guided-wave optical clock distribution, comprising:

an integrated circuit device;

a first cladding layer disposed on the back-side of the integrated circuit device; and

a core layer disposed on the first cladding layer, the core layer including:

at least one vertical-to-horizontal input diffraction grating configured to diffract a clock signal *in a plurality of directions, such that the clock signal is uniformly distributed through* the core layer;

at least one horizontal-to-horizontal diffraction grating configured to diffract the clock signal *in a plurality of directions, such that the clock signal is uniformly distributed through* the core layer; and

at least one horizontal-to-vertical output diffraction grating configured to diffract the clock signal *in a plurality of directions, such that the clock signal is uniformly distributed through* the core layer. (*Emphasis added*)

Applicants submit that *Ding* fails to disclose, teach, or suggest a “structure for unfocused guided-wave optical clock distribution, comprising... at least one vertical-to-horizontal input diffraction grating configured to diffract a clock signal *in a plurality of directions, such that the clock signal is uniformly distributed through* the core layer; at least one horizontal-to-horizontal diffraction grating configured to diffract the clock signal *in a plurality of directions, such that the clock signal is uniformly distributed through* the core layer; and at least one horizontal-to-

vertical output diffraction grating configured to diffract the clock signal *in a plurality of directions, such that the clock signal is uniformly distributed through* the core layer” as recited in claim 11. For at least this reason, Applicants submit that claim 11 is patentable over *Ding*.

2. Claim 25 is Patentable Over *Ding*

The Office Action indicates that claim 25 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 6,351,576 to Ding (“*Ding*”). Applicants respectfully traverse this rejection for at least the reason that *Ding* fails to disclose, teach, or suggest all of the elements of claim 25. Claim 25, as amended, recites:

A device, comprising:

a structure having a core layer disposed on the back-side of the structure, at least one vertical-to-horizontal input diffraction grating within the core layer, at least one horizontal-to-horizontal diffraction grating within the core layer, at least one horizontal-to-vertical diffraction output grating within the core layer, and at least one cladding layer engaging the core layer,

wherein an optical clock signal is propagated *in a plurality of directions, such that the clock signal is uniformly distributed* vertically through the structure to the core layer, into the at least one vertical-to-horizontal input diffraction grating and is then distributed *in a plurality of directions, such that the clock signal is uniformly distributed* laterally through the at least one horizontal-to-horizontal diffraction grating to the at least one horizontal-to-vertical output diffraction grating, which distributes the optical clock signal *in a plurality of directions, such that the clock signal is uniformly distributed* vertically back through the structure substrate. (*Emphasis added*)

Applicants submit that *Ding* fails to disclose, teach, or suggest a “device... wherein an optical clock signal is propagated *in a plurality of directions, such that the clock signal is uniformly distributed* vertically through the structure to the core layer, into the at least one

vertical-to-horizontal input diffraction grating and is then distributed *in a plurality of directions, such that the clock signal is uniformly distributed* laterally through the at least one horizontal-to-horizontal diffraction grating to the at least one horizontal-to-vertical output diffraction grating, which distributes the optical clock signal *in a plurality of directions, such that the clock signal is uniformly distributed* vertically back through the structure substrate” as recited in claim 25, as amended. For at least this reason, Applicants submit that claim 25 is patentable over *Ding*.

3. Claim 28 is Patentable Over *Ding*

The Office Action indicates that claim 28 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 6,351,576 to Ding (“*Ding*”). Applicants respectfully traverse this rejection for at least the reason that *Ding* fails to disclose, teach, or suggest all of the elements of claim 28. Claim 28, as amended, recites:

A method for fabricating a device having unfocused guided-wave optical clock distribution comprising:

disposed thereon; providing a substrate having a first cladding layer

disposing a core layer on the first cladding layer;

forming vertical-to-horizontal input diffraction gratings within the core layer;

forming horizontal-to-horizontal diffraction gratings within the core layer; and

forming horizontal-to-vertical output diffraction gratings within the core layer,

wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions, such that the clock signal is uniformly distributed through the core layer. (Emphasis added)

Applicants submit that *Ding* fails to disclose, teach, or suggest a “method for fabricating a

device having unfocused guided-wave optical clock distribution... *wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions, such that the clock signal is uniformly distributed through the core layer*” as recited in claim 28, as amended. For at least this reason, Applicants submit that claim 28 is patentable over *Ding*.

4. Claim 37 is Patentable Over *Ding*

The Office Action indicates that claim 37 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 6,351,576 to Ding (“*Ding*”). Applicants respectfully traverse this rejection for at least the reason that *Ding* fails to disclose, teach, or suggest all of the elements of claim 37. Claim 37, as amended recites:

A system for fabricating a device having back-side-of-die, through-wafer optical clock distribution comprising:

means for providing a substrate having a first cladding layer disposed thereon;

means for disposing an core layer on the first cladding layer;

means for forming vertical-to-horizontal input diffraction gratings within the core layer;

means for forming horizontal-to-horizontal diffraction gratings within the core layer; and

means for forming horizontal-to-vertical output diffraction gratings within the core layer,

wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions, such that the clock signal is uniformly distributed through the core layer. (Emphasis added)

Applicants submit that *Ding* fails to disclose, teach, or suggest a “system for fabricating a device having back-side-of-die, through-wafer optical clock distribution... *wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions,*

such that the clock signal is uniformly distributed through the core layer” as recited in claim 37, as amended. For at least this reason, Applicants submit that claim 37 is patentable over *Ding*.

5. Claim 38 is Patentable Over *Ding*

The Office Action indicates that claim 38 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 6,351,576 to Ding (“*Ding*”). Applicants respectfully traverse this rejection for at least the reason that *Ding* fails to disclose, teach, or suggest all of the elements of claim 38. Claim 38, as amended recites:

A structure for unfocused guided-wave optical clock distribution, comprising:

an integrated circuit device;

a first cladding layer disposed on the back-side of the integrated circuit device;

a core layer disposed on the first cladding layer, wherein the core layer includes at least one vertical-to-horizontal input diffraction grating, at least one horizontal-to-horizontal diffraction grating, and at least one horizontal-to-vertical output diffraction grating, wherein an optical clock signal is propagated vertically through the structure substrate to the core layer, into the at least one vertical-to-horizontal input diffraction grating and is then distributed laterally through the at least one horizontal-to-horizontal diffraction grating to the at least one horizontal-to-vertical output diffraction grating, which distributes the optical clock signal vertically back through the structure substrate;

at least one chip-level optical via; and

a printed wiring board substrate connected to the integrated circuit device,

wherein the first cladding layer is a write-wavelength vertical reflection absorption layer, and

wherein the at least one optical via is a dielectric filled through-wafer via,

wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions, such that the clock signal is uniformly distributed through the core layer. (Emphasis added)

Applicants submit that *Ding* fails to disclose, teach, or suggest a “structure for unfocused guided-wave optical clock distribution... *wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions, such that the clock signal is uniformly distributed through the core layer*” as recited in claim 38, as amended. For at least this reason, Applicants submit that claim 38 is patentable over *Ding*.

6. Claims 12 – 18 and 25 – 34 are Patentable over *Ding*

In addition, claims 11 – 18 are believed to be allowable for at least the reason that these claims depend from allowable independent claim 11. Further, claims 26 – 34 are believed to be allowable for at least the reason that these claims depend from allowable independent claim 25. *In re Fine, Minnesota Mining and Mfg. Co. v. Chemque, Inc.*, 303 F.3d 1294, 1299 (Fed. Cir. 2002).

B. Claims 19 – 24 and 35 – 36 are Patentable Over *Ding* in View of *Brophy*

1. Claim 19 is Patentable Over *Ding* in View of *Brophy*

The Office Action indicates that claim 19 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 6,351,576 to *Ding* (“*Ding*”) in view of U.S. Publication No. 2003/0034538 to *Brophy* (“*Brophy*”). Applicants respectfully traverse this rejection for at least the reason that *Ding* in view of *Brophy* fails to disclose, teach, or suggest all of the elements of claim 19. Claim 19, as amended recites:

A structure for unfocused guided-wave optical clock distribution, comprising:

an integrated circuit device;

a first cladding layer disposed on the back-side of the integrated circuit device, wherein the first cladding layer includes at least one vertical-to-horizontal input diffraction grating, at least one horizontal-to-horizontal diffraction grating, and at least one horizontal-to-vertical output diffraction grating; and

a core layer disposed on the first cladding layer,

wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions, such that the clock signal is uniformly distributed through the first cladding layer.
(Emphasis added)

Applicants submit that *Ding* in view of *Brophy* fails to disclose, teach, or suggest a “structure for unfocused guided-wave optical clock distribution... *wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions, such that the clock signal is uniformly distributed through the first cladding layer*” as recited in claim 19, as amended. Applicants submit that neither *Ding* nor *Brophy* disclose, teach, or suggest all of the elements of claim 19, as amended. For at least this reason, Applicants submit that claim 19 is patentable over *Ding* in view of *Brophy*.

2. Claim 22 is Patentable Over *Ding* in View of *Brophy*

The Office Action indicates that claim 22 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 6,351,576 to *Ding* (“*Ding*”) in view of U.S.

Publication No. 2003/0034538 to Brophy (“*Brophy*”). Applicants respectfully traverse this rejection for at least the reason that *Ding* in view of *Brophy* fails to disclose, teach, or suggest all of the elements of claim 22. Claim 22, as amended recites:

A structure for unfocused guided-wave optical clock distribution, comprising:
an integrated circuit device;
a first cladding layer disposed on the back-side of the integrated circuit device;
a core layer disposed on the first cladding layer, and
a second cladding layer disposed on the core layer, wherein the second cladding layer includes at least one vertical-to-horizontal input diffraction grating, at least one horizontal-to-horizontal diffraction grating, and at least one horizontal-to-vertical output diffraction grating,
wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions, such that the clock signal is uniformly distributed through the second cladding layer.
(Emphasis added)

Applicants submit that *Ding* in view of *Brophy* fails to disclose, teach, or suggest a “structure for unfocused guided-wave optical clock distribution... ***wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions, such that the clock signal is uniformly distributed through the second cladding layer***” as recited in claim 22, as amended. Applicants submit that neither *Ding* nor *Brophy* disclose, teach or suggest all of the elements of claim 22, as amended. For at least this reason, Applicants submit that claim 22 is patentable over *Ding* in view of *Brophy*.

3. **Claim 35 is Patentable Over *Ding* in View of *Brophy***

The Office Action indicates that claim 35 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 6,351,576 to Ding (“*Ding*”) in view of U.S.

Publication No. 2003/0034538 to Brophy (“*Brophy*”). Applicants respectfully traverse this rejection for at least the reason that *Ding* in view of *Brophy* fails to disclose, teach, or suggest all of the elements of claim 35. Claim 35, as amended recites:

A method for fabricating a device having unfocused guided-wave optical clock distribution comprising:
providing a substrate having a first cladding layer disposed thereon;
forming vertical-to-horizontal input diffraction gratings within the first cladding layer;
forming horizontal-to-horizontal diffraction gratings within the first cladding layer;
forming horizontal-to-vertical output diffraction gratings within the first cladding layer; and
disposing a core layer on the first cladding layer,
wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions, such that the clock signal is uniformly distributed through the first cladding layer.
(Emphasis added)

Applicants submit that *Ding* in view of *Brophy* fails to disclose, teach, or suggest a “method for fabricating a device having unfocused guided-wave optical clock distribution... ***wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions, such that the clock signal is uniformly distributed through the first cladding layer***” as recited in claim 35, as amended. Applicants submit that neither *Ding* nor *Brophy* disclose, teach or suggest all of the elements of claim 35, as amended. For at least this reason, Applicants submit that claim 35 is patentable over *Ding* in view of *Brophy*.

4. **Claim 36 is Patentable Over *Ding* in View of *Brophy***

The Office Action indicates that claim 36 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 6,351,576 to Ding (“*Ding*”) in view of U.S. Publication No. 2003/0034538 to Brophy (“*Brophy*”). Applicants respectfully traverse this rejection for at least the reason that *Ding* in view of *Brophy* fails to disclose, teach, or suggest all of the elements of claim 36. Claim 36, as amended recites:

A method for fabricating a device having unfocused guided-wave optical clock distribution comprising:
providing a substrate having a first cladding layer disposed thereon;
disposing a core layer on the first cladding layer;
disposing a second cladding layer on the first cladding layer;
forming vertical-to-horizontal input diffraction gratings within the second cladding layer;
forming horizontal-to-horizontal diffraction gratings within the second cladding layer; and
forming horizontal-to-vertical output diffraction gratings within the second cladding layer,
wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions, such that the clock signal is uniformly distributed through the second cladding layer.
(Emphasis added)

Applicants submit that *Ding* in view of *Brophy* fails to disclose, teach, or suggest a “method for fabricating a device having unfocused guided-wave optical clock distribution... ***wherein at least one of the diffraction gratings is configured to diffract a clock signal in a plurality of directions, such that the clock signal is uniformly distributed through the second cladding layer***” as recited in claim 36, as amended. Applicants submit that neither *Ding* nor *Brophy* disclose, teach or suggest all of the elements of claim 36, as amended. For at least this reason, Applicants submit that claim 36 is patentable over *Ding* in view of *Brophy*.

5. **Claims 20 – 24 are Patentable over *Ding* in View of *Brophy***

In addition, claims 20 – 24 are believed to be allowable for at least the reason that these claims depend from allowable independent claim 11. *In re Fine, Minnesota Mining and Mfg. Co. v. Chemque, Inc.*, 303 F.3d 1294, 1299 (Fed. Cir. 2002).

III. **Office Action's Findings of Inherency**

A. **Claim 16**

On page 6 the Office Action states “[w]ith respect to the inherency argument of claim 16 on page 20 of arguments, there are no arguments giving a reason for the traversing of the inherency finding. In particular, there are no examples giving of when a detector and source to not have some sort of via for a signal to travel from one to the other through.” Applicants refer to MPEP 2144.03(C), which states

[t]o adequately traverse such a finding, an applicant must specifically point out the supposed errors in the examiner's action, which would include stating why the noticed fact is not considered to be common knowledge or well-known in the art. If applicant adequately traverses the examiner's assertion of official notice, the examiner must ***provide documentary evidence in the next Office action if the rejection is to be maintained.*** (*Emphasis added*)

Applicants submit that Applicant's previous response adequately traversed the inherency finding, thereby placing the burden on the Examiner to “provide documentary evidence, in order to maintain the rejection.” Applicants therefore submit that Applicants need not provide “examples” of the alleged inherent fact. For at least this reason, Applicants again traverse Office

Action's finding of inherency with respect to claim 16, and submit that claim 16 is patentable over the cited art.

B. Claim 36

On page 7, the Office Action states “[w]ith respect to the inherency argument of claim 36 on page 46 of the arguments, the applicant does not give a reason that given a structure, why it wouldn’t be inherent to have a method of fabricating that structure with no limitations on the fabrication technique except for repeating the structure itself and with the word “providing” before each structural element.” Applicant respectfully submits that claim 36 does not “have a method of fabricating [a] structure with no limitations on the fabrication technique except for repeating the structure itself... with the word ‘providing’ before each structural element.” Applicant again traverses the finding of inherency, and submits that claim 36 is patentable over the cited art.

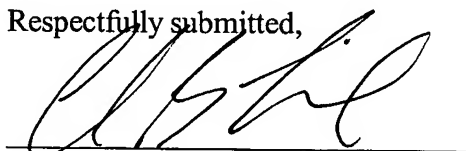
CONCLUSION

In light of the foregoing amendments and for at least the reasons set forth above, Applicants respectfully submit that all objections and/or rejections have been traversed, rendered moot, and/or accommodated, and that the now pending claims 11 – 38 are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested.

In addition, any other statements in the Office Action that are not explicitly addressed herein are not intended to be admitted. In addition, any and all findings of inherency are traversed as not having been shown to be necessarily present. Furthermore, any and all findings of well-known art and official notice, or statements interpreted similarly, should not be considered well known since the Office Action does not include specific factual findings predicated on sound technical and scientific reasoning to support such conclusions.

If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

Respectfully submitted,



Christopher B. Linder
Registration No. 47,751

**THOMAS, KAYDEN, HORSTEMEYER
& RISLEY, L.L.P.**

Suite 1750
100 Galleria Parkway N.W.
Atlanta, Georgia 30339
(770) 933-9500